

Disease Surveillance and Investigation Branch

# DISEASE SURVEILLANCE REPORT

## Northern Ireland Disease Surveillance Report, January to March 2019

- K99 positive colibacillosis in calves
- Renal amyloidosis in a dairy cow
- Schmallenberg virus infection in sheep
- Fasciolosis in ewes
- *Actinobacillus suis* infection in piglets
- CCN in a grey seal

These are some of the matters discussed in the Northern Ireland animal disease surveillance quarterly report for January to March 2019

### CATTLE:

#### Respiratory diseases

Respiratory disease was identified in 45 cattle post mortem submissions between January and March 2019. The most common pathogens identified included *Mycoplasma bovis* (fourteen cases), *Pasteurella multocida* (eleven cases), *Mannheimia haemolytica* (ten cases), *Haemophilus somnus* (three cases), bRSV (two cases) and *Trueperella pyogenes* (two cases).

Acute bovine respiratory disease (BRD) was diagnosed in two four-month-old calves which had previously been vaccinated with a polyvalent intra-nasal respiratory virus vaccine at around ten days of age. On gross examination there were lesions of severe pneumonia present with deep purple coloured consolidation of the cranial and cardiac lobes, there was abscessation with green (plastic) or caseous pus present within the consolidated areas. Around 30% of the lung field was affected in each case. The remaining parenchyma was pinkish-grey in colour. Histological examination showed acute to sub-acute suppurative bronchopneumonia with bronchiolitis and lesions extending from the bronchioles into the parenchyma with pneumocyte necrosis and expansion of the alveolar walls with a mixed cell inflammatory infiltrate. Micro-abscessation was present and some lesions showed a small caseous core. The histology was considered to be consistent with an acute bacterial pneumonia with likely *Mycoplasma bovis* involvement. *Histophilus somni* and *Pasteurella multocida* were recovered from lung cultures and RT-PCR showed the presence of *Mycoplasma bovis* nucleic acid. Immunofluorescence was negative for respiratory virus antigen (RSV, PI3, IBR and BVD).

#### Alimentary diseases

##### *Salmonella* Dublin infection

S. Dublin infection was diagnosed in an adult cow in which possible botulism had been suspected on clinical grounds. On gross examination, the pyloric and proximal duodenal serosa and walls were thickened with copious gelatinous oedema. The mucosa of the duodenum was thickened and severely congested with multifocal pinpoint haemorrhages and the contents were dark, slightly blood-tinged and fluid.

Histological examination of the liver showed multifocal acute fibrinoid necrosis of hepatocytes and centrilobular congestion with focal accumulations of mononuclear cells associated with the necrotic areas. These observations were consistent with the gross findings of an enlarged, swollen and friable liver showing marked focal necrosis and cholecystitis.

### Traumatic reticulitis

Traumatic reticulitis due to hardware injury ('wire') with associated fibrinous peritonitis was diagnosed in two heifers in separate herds during the quarter. In one instance there was exsanguination due to perforation of a blood vessel in the reticular wall. In both cases embedded wires were found in situ.

### Dosing gun injury

There was a large ruptured mass in the oropharynx of a five-year-old cow previously diagnosed with laryngitis but unresponsive to treatment. The mass contained largely haemorrhagic bloody content. Haemorrhage from the mass had led to death with a large volume of clotted and unclotted blood in the reticulorumen. It was considered that pharyngeal trauma was the most likely cause of the mass. Apparently this cow was dosed about one month before death. The nature and chronicity of the histological changes present were consistent with injury at this time.

Perforation of the oesophagus was seen in an eleven-month-old steer following reported sudden death. On post mortem examination, the carcass was pale with a large amount of clotted blood in the oral cavity. A large perforation was present in the dorsal wall of the proximal oesophagus with considerable associated haemorrhage. A large fibrinous and haemorrhagic tract proceeded distally along the outside of the oesophagus and contained a large bolus. Ruptured blood vessel ends could be identified in this tract.

### Neonatal enteritis

The pathogens identified in neonatal bovine faecal samples during the quarter are shown in TABLE 1. Overall, *Cryptosporidium* species and rotavirus were the most common pathogens identified.

TABLE 1: Pathogens identified in neonatal bovine faecal samples in Northern Ireland, January to March 2019.

| Pathogen                       | Number |                      |
|--------------------------------|--------|----------------------|
|                                | Tested | Positive ( per cent) |
| <i>Cryptosporidium</i> species | 251    | 92 (36.6%)           |
| Rotavirus                      | 245    | 94 (38.4%)           |
| Coronavirus                    | 260    | 13 (5.0%)            |
| <i>Escherichia coli</i> K99    | 186    | 14 (7.5%)            |

K99 positive *E. coli* infection was confirmed in calves from two separate herds during the reporting period. Ages of affected calves ranged from one to twenty one days with the younger calves still sucking the cow and the older calves being bucket fed. In all cases uptake of colostral antibodies had been low with ZST values typically in the range of 2- to 4 units (adequate: 20 units). One of the older calves had an intercurrent fungal rumenitis possibly related to abomasal acidosis and colonisation of the damaged mucosa. Advice was given on colostrum transfer, milk feeding hygiene and appropriate antimicrobial use.

### Other enteric conditions

Parasitic ova found in ruminant faeces samples submitted during the period are shown in TABLE 2.

TABLE 2: Endoparasitic infections in ruminants in Northern Ireland, January to March 2019.

|                          | Total | No of parasitic ova |          |    |     |      | % positive |
|--------------------------|-------|---------------------|----------|----|-----|------|------------|
|                          |       | Negative            | +        | ++ | +++ | ++++ |            |
| Liver fluke              |       |                     |          |    |     |      |            |
| Bovine                   | 461   | 426                 | 28       | 6  | 1   | 0    | 7.6%       |
| Ovine                    | 167   | 148                 | 12       | 4  | 0   | 3    | 11.4%      |
| Paramphistome            |       |                     |          |    |     |      |            |
| Bovine                   | 461   | 197                 | 53       | 99 | 47  | 65   | 57.3%      |
| Ovine                    | 167   | 102                 | 18       | 23 | 7   | 17   | 38.9%      |
| Coccidia                 |       |                     |          |    |     |      |            |
| Bovine                   | 525   | 442                 | 71       | 2  | 4   | 6    | 15.5%      |
| Ovine                    | 197   | 71                  | 102      | 2  | 3   | 19   | 63.9%      |
|                          |       |                     |          |    |     |      |            |
| Strongyle worm egg count | Total | <500 epg            | ≥500 epg |    |     |      | % Positive |
| Bovine                   | 525   | 637                 | 7        |    |     |      | 1.3%       |
| Ovine                    | 197   | 165                 | 45       |    |     |      | 22.8%      |

≥500 eggs per gram of faeces (epg) was considered of likely clinical significance  
+ Low, ++ Moderate, +++ High, ++++ Very high

### Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out on 375 bovine faecal samples by PCR. MAP was detected in 78 samples (20.8 per cent). Of 801 bovine blood samples that were tested for antibodies to MAP, 195 (24.3 per cent) were positive.

### Nutritional and metabolic disease

#### Copper and lead toxicity

High (150 – 183 µg/g) levels of lead were detected in the kidney of two cows submitted from a herd in which two out of fourteen cows had died and the others were described as sick. The source of the lead was not found but the incident may have been due to feeding silage cut from a roadside field.

Another case in another herd involved the detection of high copper levels in the liver (300 µg/g: normal range 25 – 100 µg/g) and kidney (59 µg/g: normal range 4 – 6 µg/g) in a cow submitted following digestive upset with lethargy and ruminal stasis. On gross examination the carcass was dark, the fascia was stained dark brown/yellow and the blood was very dark. The liver was markedly swollen and friable and the kidneys were dark red/brown in colour. The bladder was flaccid but of large volume and the remaining urine was dark brown in colour.

### Reproductive and mammary diseases

#### Abortion

Specimens from 120 bovine abortions and stillbirths were examined during the 1st quarter. Significant pathogens were detected in 49 cases (40.8 per cent). Of these, *Bacillus licheniformis* (15 cases, 12.5 per cent) was the most commonly identified pathogen. Other pathogens identified included *T. pyogenes* (12 cases, 10.0 per cent), *E. coli* (8 cases, 6.7 per cent), BVD (4 cases, 3.3 per cent) and *Neospora caninum* (3 cases, 2.5 per cent).

### Other reproductive diseases

A case of incomplete development of the small intestine was described in a thirty six-hour-old calf which had failed to suck. The alimentary tract ended blindly in the mid-jejunum with no connection between the proximal and distal portions of the bowel and distension of the developing rumen, abomasum and proximal intestine with fluid.

A different case was described as generalised fibrinopurulent peritonitis and leakage of intestinal content in a three-week-old calf from another herd. There was again a jejunal defect with complete separation of the two ends of the jejunum. The jejunum and ileum were intensely reddened for 30 – 40 cms anterior and posterior to the defect. *E. coli* was recovered in septicæmic distribution. In the first case a congenital defect was suspected, in the second case the aetiology was less clear and trauma may have been a cause. It was noted that several such cases have been seen and the cause is unclear.

### Rupture of the uterine artery

Rupture of the uterine artery with exsanguination was described in a five-year-old cow which died suddenly. On gross examination the mucous membranes and tongue were pale, and a very large amount of fresh blood and clotted blood was present in the in abdomen.

There was hæmorrhage in the caudal abdomen centred on the left uterine suspensory ligament, with rupture of the uterine artery. An incidental hepatic abscess was also seen in this case.

### Mastitis

A total of 305 bacterial isolates were cultured from milk samples submitted from acute and chronic mastitis cases. 24 (7.9 per cent) samples yielded cultures of more than two organisms and were considered to be potentially contaminated. No bacteria were cultured in a further 33 samples. *E. coli* was the most frequently isolated organism and accounted for 26.6 per cent of isolates cultured. Other frequently identified organisms included, *Streptococcus uberis* (15.7 per cent), *Pseudomonas aeruginosa* (8.9 per cent), *Staphylococcus aureus* (7.2 per cent), *Streptococcus dysgalactiae* (4.3 per cent) and *B. licheniformis* (3.9 per cent).

### Neurological diseases

*Clostridium botulinum* type C / D toxicosis was diagnosed in three cases during the 1st quarter of 2019. Histological changes in the brain typical of hepatic encephalopathy were seen in a three –month-old calf submitted with a history of with neurological signs. There was marked neuropil vacuolation of the cerebral grey matter, with large vacuolated spaces particularly deep in the cortex, near the junction of the white and grey matter. There was marked vacuolar change in the white matter tracts of the mid brain, brain stem and reticular formation.

### Other diseases of cattle

#### Renal amyloidosis and infarction

A twelve-year-old dairy cow was submitted due to sudden death. On post mortem examination there was severe renal pathology with enlarged, pale, firm kidneys with an uneven surface. Histology showed interstitial fibrosis and lymphoplasmacytic infiltration with tubular atrophy and tubular dilation with pink hyaline casts (thyroidization), particularly of the medulla. Amyloidosis was confirmed using Congo Red staining.

Renal infarction and amyloidosis associated with *T. pyogenes* septicæmia was diagnosed on full post mortem examination of an eight-year-old cow which had become ill-thrifty and thin. Grossly, multiple pale foci and an extended area of necrosis were detected in the cortex of the kidneys and on histological examination there was an acute focal to disseminated interstitial nephritis with bacterial colonisation and tubular necrosis. There was incipient abscessation, infarction, thrombosis, older fibrosed lesions of infarction and amyloidosis.

### Cardiovascular disease

A second calver cow was submitted following a period of malaise and subsequent abortion. Gross examination showed purulent polyarthritis, endocarditis, pyelonephritis and renal infarction.

*T. pyogenes* was recovered in significant numbers from multiple organs, including the left atrioventricular valve of the heart, kidney, multiple joints and the uterus. The same organism was also isolated from the foetus, which may suggest its direct involvement in the abortion.

## SMALL RUMINANTS: SHEEP

### Respiratory diseases

Respiratory disease was identified in 10 ovine post mortem case submissions during this quarter. Jaagsiekte (six cases) and pasteurellosis due to *M. haemolytica* infection (four cases) were the most common diagnoses. An unusual case of pleural effusion was seen in an in-lamb ewe. On gross examination the thoracic cavity was full of brownish fluid, with some fibrin. The lungs were not consolidated and there were no gross lesions of Jaagsiekte present. High paraphistome and moderately high strongyle species faecal egg counts were detected. Findings were otherwise unremarkable and the foetus had not pre-deceased the dam. The parasite burden was considered clinically significant and the cause of death was believed to be respiratory failure due to pleural effusion, the cause of which was not diagnosed.

### Alimentary diseases

Acute and sub-acute fasciolosis was diagnosed on full post mortem examination of a pregnant ewe submitted in late February. The history described abortion and death with six out of one hundred ewes being affected over a short period of time. At necropsy the liver was grossly swollen, friable and necrotic, there was a very large blood clot adherent to the visceral surface and there were multiple haemorrhagic tracts through the parenchyma and some fibrous thickening of the bile ducts. These lesions were considered consistent with severe acute/sub-acute fasciolosis. Histological examination was consistent with this and showed numerous, large, haemorrhagic necrotising tracts bordered by necrotic hepatocytes and degenerating leucocytes. The associated sinusoidal macrophages were laden with haemosiderin. There was also extensive immature and mature peri-portal fibrosis with associated lymphocytic infiltration and disruption of parenchymal architecture. These changes were considered to reflect more sub-acute disease and chronic exposure to liver fluke. Using a forecasting system based on climate data, AFBI predicted that although the overall risk of liver fluke infection during autumn and winter 2018 - 2019 would be moderate across Northern Ireland, there would be some areas where the risk would be high. Clearly this was a high risk flock and the lateness of the acquired infection was also noteworthy in that it corresponded to a pattern report in other areas of the UK this winter and early spring.

### Johne's disease

Examination for *Mycobacterium avium* subspecies *paratuberculosis* (MAP) was carried out on 13 ovine faecal samples by PCR. MAP was detected 2 (15.4 per cent) samples by PCR. 3 ovine bloods samples were tested for antibodies to MAP during this quarter, 2 (66.7 per cent) were positive.

### Dosing gun injury

Dosing gun injuries were reported in sheep as well as those mentioned above in cattle. Perforation of the oesophagus caudal to the pharynx, with extensive thickening and adhesion of the adjacent musculature of the neck and leakage of ingesta was detected on gross post mortem examination of one such case. Bacteriology findings showed a mixed bacterial infection with *T. pyogenes* and *B. trehalosi* predominating.

### Scrotal hernia in a ram

A three-year-old ram was submitted due to sudden death. Bilateral scrotal hernias were evident on post mortem examination, more pronounced on the left. A portion of bowel had protruded into the scrotum causing a gastrointestinal obstruction. The affected bowel was devitalised.

### Nutritional and metabolic disease

The early –to-mid March weather was inclement, and perishing in lambs was seen in some flocks. Some instances were noteworthy because slightly older than usual lambs of around two weeks of age were affected. Carcasses were unremarkable on gross examination although an absence of body fat and milk in the stomachs were common features. ZST results showed poor transfer of maternal



antibody in most but not all and cause of death was considered to be hypothermia and starvation, there being no indication of infectious disease.

### Copper poisoning

Copper poisoning was diagnosed in a ewe which died after a period of dullness. This was the third ewe to die in the flock. At necropsy the ewe appeared icteric. The liver was dark in colour and kidneys were very black. Liver (420.6 µg/g: normal range 20 – 100 µg/g) and kidney (75.3 µg/g: normal range 4 – 5.5 µg/g) copper levels were consistent with copper toxicosis.

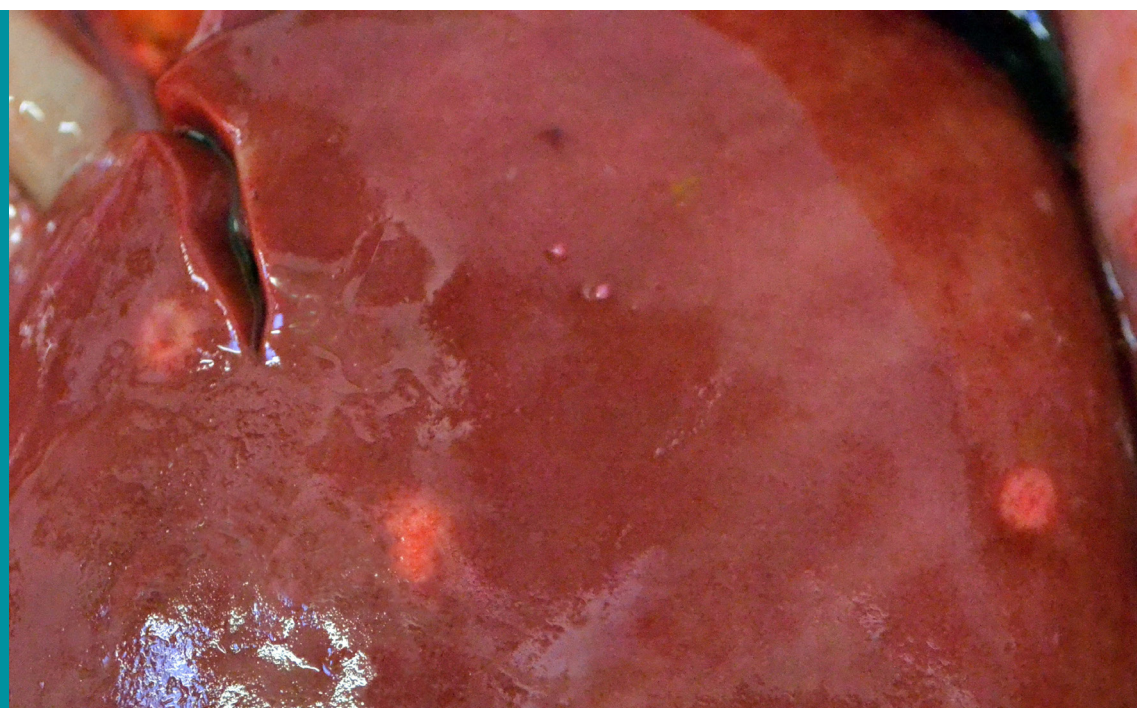
### Reproductive diseases

#### Abortion

Specimens from 134 ovine abortions and stillbirths were examined during the 1st quarter of 2019. The pathogens identified were *Chlamydophila abortus* (40 cases, 29.9 per cent), *Toxoplasma gondii* (30 cases, 22.4 per cent), *E. coli* (5 cases, 3.7 per cent), *Listeria monocytogenes* (5 cases, 3.7 per cent) and *T. pyogenes* (3 cases, 2.2 per cent).

#### *Campylobacter* abortion in ewes

Cases of *Campylobacter* abortion were recorded in two separate flocks during the period. In one instance there was also evidence of *C. abortus* infection (EAE) as well as *Campylobacter fetus fetus*. One of the submitted foeti showed classic liver lesions (FIGURE 1) and *Campylobacter fetus fetus* was recovered in profuse growth from the foetal stomach contents (FSC).



**Figure 1**

Liver of an aborted lamb showing multiple pale foci throughout, *Campylobacter fetus fetus* was recovered in profuse growth from the FSC

### SMALL RUMINANTS: GOATS

Necrotising enteritis of the caecum and colon was diagnosed in a six-year-old female goat. On histology there was severe acute superficial necro-haemorrhagic typhlitis, with numerous rod-shaped bacteria, including small colonies, associated with fibrino-necrotic debris attached to the surface and free in the lumen. A profuse growth of *Cl. perfringens* was recovered from the lesions but clostridial toxin testing yielded negative results.

### HORSES:

89 swabs were examined for the presence of *Tayorella equigenitalis* during this quarter, all were negative. 7 swabs were cultured from a horse with a history suggestive of strangles during this quarter, all were negative.

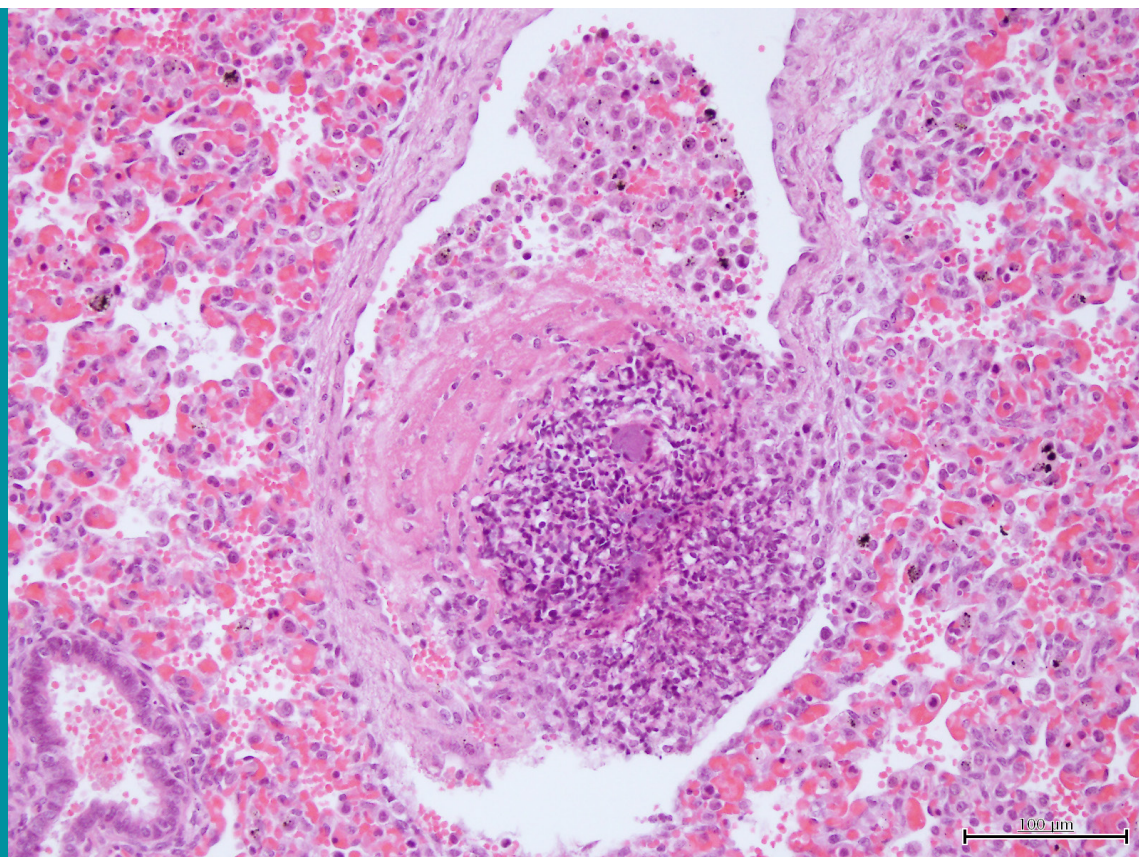
### Larval cyathostomosis

A three-year-old pony was euthanased on welfare ground following dullness and inappetence and submitted for post mortem examination. The yard had experienced another death in the past week. On gross examination the proximal colon mucosa was thickened with a pseudo-diphtheritic membrane and multifocal depressed lesions beneath. The caecal mucosa was thickened with an uneven surface and diffuse depressed, haemorrhagic foci. On histology, in all sections of the caecum and colon there were profiles of encysted cyathostome larvae within the mucosa and submucosa. In areas where the mucosa remained intact there was focal necrosis, and there were extensive mixed inflammatory infiltrates diffusely throughout the submucosa and lamina propria. Within the submucosa and lamina propria there was oedema, focal haemorrhage and thrombosis of vessels. The histological changes were considered to be consistent with larval cyathostomosis.

### PIGS:

#### *Actinobacillus suis* infection in piglets

Septicaemia due to *A. suis* was diagnosed in four five-day-old piglets. The piglets presented weak at birth and faded by four to five days. On gross examination there were pronounced epicardial haemorrhages, purulent pericarditis, ecchymotic haemorrhages in lungs and thickened joint capsules and tendon sheaths. Histologically there was severe necrotizing epicarditis, myocarditis, meningo-encephalitis with abundant intralesional bacteria and there was severe septic pulmonary thrombo-embolism (FIGURE 2). *A. suis* was cultured in septicaemic distribution from all four piglets. *A. suis* is a bacterium which resides in the tonsils and upper respiratory tract. Historically it has been associated with cases of septicaemia in very young piglets, suckling piglets and weaned piglets. Disease is observed when stresses such as weaning, transportation and parturition enable the bacteria to overcome the natural immune defence. *A. suis* is associated with a wide range of diseases including sudden death, septicaemia, arthritis, endocarditis, pneumonia, meningitis and skin lesions. Disease due to *A. suis* has been associated with high health status pigs of all ages.



**Figure 2**

Bacterial embolus in a pulmonary blood vessel in a five-day-old piglet with *A. suis* septicaemia

### Alimentary disease

*Salmonella Typhimurium* was recovered in septicaemic distribution from an eleven-week-old pig which showed evidence of colitis and meningitis on gross post mortem and histological examination.



### Mesenteric torsion

Mesenteric torsion was diagnosed in three four-month-old growing pigs submitted with a history of sudden death. On necropsy the torsion had resolved after death but there was segmental blood stained contents in the small intestine in each case, with congestion of the serosa and mucosa and engorgement of the mesenteric vessels. Routine culture and virology results were unremarkable.

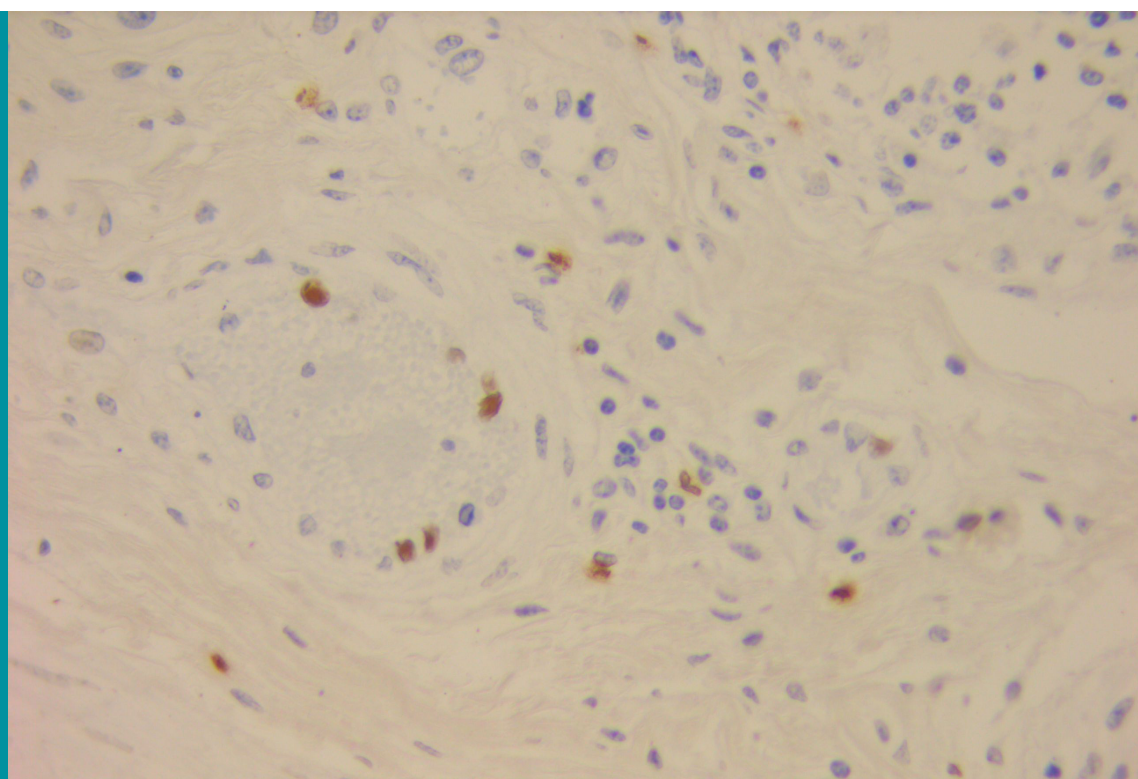
### BIRDS: Poultry

#### Chondronecrosis in chickens

Bacterial chondronecrosis and osteomyelitis associated with *Enterococcus caecorum* and *Staphylococcus* sp. were diagnosed in two separate flocks during the period. Acute tenosynovitis was also a feature of the condition. Reovirus was isolated from affected tendon tissue in both cases, and from the heart in one case.

#### Arthritis in ducks

Synovitis of the hock and tendonitis in the flexor tendon (FIGURE 3) due to *Pasteurella multocida* was diagnosed in a group of forty-day-old ducks submitted with a history of wasting and discomfort.



**Figure 3**

Swelling due to synovitis and tendonitis associated with *P. multocida* infection in a duck

### Histomonosis

Histomonosis was diagnosed in twenty eight- week-old laying hens which were failing to achieve expected peak production. On histology there was typhlitis with numerous eosinophilic round bodies containing a darkly stained nucleus and located within clear lacunae present within the mucosa, lamina propria, submucosa and tunica muscularis. There was necrosis and loss of mucosal crypts with an associated inflammatory infiltrate of heterophils, lymphocytes and macrophages. The lesions were considered typical of *Histomonas meleagridis* infection.

### WILDLIFE and EXOTICS:

Poisoning due to ingestion of yew (*Taxus* sp) was diagnosed in wild deer. These had been found dead and at necropsy a large numbers of yew sprigs were found in the reticulum and rumen contents (FIGURE 4 next page). Yew contains numerous toxic compounds including alkaloids and nitriles. The principle toxin is the alkaloid taxin which blocks myocardial conduction and causes cardiac arrest through its action on the sodium and calcium channels of cardiac myocytes.

FIGURE 4: Yew sprigs in the rumen of a wild deer



**Figure 4**

Yew sprigs in the rumen of a wild deer

#### Cerebrocortical necrosis (CCN) in a grey seal

CCN was diagnosed in a sub-adult female grey seal from a rehabilitation centre. The seal had presented clinically with lethargy, weight loss and neurological signs and was one of a group of three affected. Gross examination showed generalised congestion of the carcass but was otherwise unremarkable. Histological examination of the brain showed polioencephalomalacia with neuropil oedema, laminar separation, neuronal necrosis and the presence of large plump Gitter cells. There was disintegration of the underlying white matter. CCN in seals has been associated with thiaminases present in raw fish including herring. Herring is frequently used as part of the diet of seals in human care.